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SECTION 3.2

OPERABLE UNIT 8
FIRE TRAINING AREA

3.2.1 SCOPE AND NATURE OF FIVE-YEAR REVIEW

The USAF coordination with USEPA, Region I and the MEDEP conducted this review of the Fire Training Area (FTA) site remedy pursuant to CERCLA section 121(c), NCP section 300.400 (f) (4) (ii), and OSWER Directives 9355.7-02 (May 23, 1991) and 93557-02A (June 26, 1994). It is a policy review. The purpose of the review is to ensure that a remedial action remains protective of public health and the environment. This document has been prepared within the scope of a level Ia review which is applicable for this site.

3.2.2 SUMMARY OF SITE CONDITIONS

3.2.2.1 Location and Description

The FTA is located east of the runway in the northwest portion of the base (see Figure 3.2-1). The FTA occupies approximately 12 Acres. The terrain is open and well drained. Prior to remedial action it consisted of a mock aircraft located in a circular pit which drained to an OWS.

3.2.2.2 Site History

The FTA site has been managed as a "source control" site for the purposes of remediating soil media for the protection of human health and the environment and elimination of sources of groundwater contamination. The FTA was used from 1952 to 1988 for fire training activities. During training exercises, waste fluids consisting of fuels, oils, and solvents, were released into the pit, ignited and extinguished. In 1981, a bentonite liner was added to the pit, a berm was constructed around the pit, and a UST and OWS were installed. Unburned fluids were piped to the OWS, with fuel product diverted to the UST and water diverted to a ditch on the north side of the FTA Access Road. A UST, located west of the pit, was reportedly used to store flammable liquids prior to use in the fire training pit. The USTs and associated piping were removed in 1994.

The likely sources of contamination at the FTA site include the release of waste fluids to the FTA pit during training exercises, the USTs, and the OWS. These areas cover approximately 4 acres of the central portion of the FTA site. The RI identified primarily fuel-related VOCs and SVOCs, as well as TPH, in surface and subsurface soils at the site; however, low concentrations of chlorinated VOCs were also detected. An area of fuel product in the shallow bedrock has also been identified at the FTA site.

The Air Force evaluated the potential risks to human health and developed preliminary remediation goals for the FTA site based on the future land use determination made in the

Disposal ROD (AFBCA, 1996). The Air Force also considered potential risks to the environment (i.e., ecological hazards and leaching to groundwater) and proposed site-specific preliminary remediation goals (PRGs) that are protective of human health and the environment in the *EE/CA for Operable Unit 8* (URS, 1995a).

A number of actions have occurred at the FTA under the Air Force's CERCLA removal authority based on the 1995 PRGs.

FTA Soils. The *EE/CA for Operable Unit 8* (URS, 1995a) and *Action Memorandum for Operable Unit 8* (URS, 1995b) recommended a combination of bioventing and excavation of contaminated soil with disposal at LF-3. Removal actions were conducted at the FTA between 1995 and 1999. In 1995, the OWS and several areas of contaminated soil were excavated and the contaminated soil was disposed of at LF-3. The site-specific, risk-based PRGs were met by excavating 4,510 cy of soil.

A bioventing system was also installed in 1995 in the vicinity of the pit and discharge pipeline. The final inspection of the bioventing system installation was performed in early spring of 1996, and the system was certified operational and functional. The bioventing system operated until 1998, when soil confirmation sampling was conducted. Xylene, naphthalene, and 2-methylnaphthalene were detected at concentrations above the 1995 PRGs. Based on the confirmation sampling results, the bioventing system was decommissioned and approximately 23,100 cy of contaminated soil were excavated and disposed of at LF-3.

Based on the 1998 post-excavation soil confirmation sampling results, xylene was detected at one location south of the former pit at a concentration of 24 mg/kg, exceeding the ecological risk based PRG of 20 mg/kg. Since the confirmation sample was taken from a location deeper than two feet below ground surface there is no completed risk pathway for ecological receptors (BEI, 1999). The residual soil contamination does not pose an unacceptable risk under CERCLA to human health or environmental receptors and is not demonstrated to impact groundwater quality. Appendix A presents the summarized confirmation sample results and the risk-based remediation goals.

Based on 1998 test pit and post-excavation soil confirmation sampling results, approximately 4,650 cy of fuel-contaminated soil were excavated in an area northwest of the former pit in 1999 and the excavated soil was disposed of at LF-3. The 1999 confirmation soil sample results met the 1995 PRGs (AFBCA, 1999).

Subsequent to development of the 1995 PRGs, worst-case risk-based soil concentrations (RBSCs) were developed to evaluate unlimited use and unrestricted exposure based on the most conservative receptor (i.e., commercial/industrial worker, construction worker, and child and adult residential exposures). These values are based on a human health carcinogenic risk of $1x10^{-6}$ or an HI of 1 for noncarcinogenic risks and are included in Table 1 of the *Unrestricted Land-Use Determination for OU 9, Snow Barn Site* (HAZWRAP, 2000). The maximum confirmation soil sample results from all the soil removals have been compared to the worst-case RBSCs. The Air Force has determined that contaminant

concentrations in the source area (i.e., surface and subsurface soils) are below risk levels based on unlimited use and unrestricted exposure. Appendix A presents the summarized results.

FTA Product. In 1995, a product recovery pilot study was initiated to evaluate the feasibility of recovering free product from shallow bedrock aquifer at the FTA site. The pilot study included a blast fractured bedrock recovery trench downgradient of the free product, extraction wells, and a groundwater treatment facility. Treated groundwater was discharged to surface drainage. The recovery trench and extraction wells created a capture zone for product; however, an insufficient quantity of product accumulated to facilitate recovery from the bedrock trench.

The product at the FTA site was analyzed for characterization and disposal; however, it was not analyzed for specific chemical constituents. Chlorinated solvents were detected in subsurface soil and groundwater at the FTA site, and may be present in the product (LNAPL). Therefore, product at the FTA site will continue to be addressed under the CERCLA process. In the future, if the product is demonstrated not to contain CERCLA contaminants (i.e., the product contains only petroleum constituents), further product recovery will be conducted in accordance with applicable state requirements (i.e., MEDEP Chapter 691, Rules for Underground Oil Storage Facilities and MEDEP Procedural Guidelines for Establishing Standards for the Remediation of Contaminated Soil and Groundwater).

3.2.3 SUMMARY OF RESPONSE ACTION SELECTED

3.2.3.1 Remedial Action Objectives

RAOs are developed to serve as a framework for the identification of remedial action alternatives. According to the Federal and State guidance, RAOs should be designed to protect human health and the environment by identifying COCs, receptor groups of greatest concern, exposure routes associated with the highest risk estimates, and a target risk level of the individual contaminants based on site-specific exposure scenarios (i.e., RGs).
The RAOs for the FTA for the protection of human health and the environment include:

- Recover light-non-aqueous phase liquid (LNAPL) from the shallow bedrock to remove a continual source of groundwater contamination.

3.2.3.2 Selected Remedial Action

No Further Action was required for the source area (i.e., surface and subsurface soils) at the FTA site because the contaminated soils were removed to acceptable risk levels (based on unlimited use and unrestricted exposure) through a series of removal actions; however, because product is still present in the shallow bedrock, the FTA site is currently not available for unlimited use and unrestricted exposure.

Passive product recovery will be performed by systematic removal of product from individual monitoring wells at the FTA site using bailer or skimmer pumps. The recovered product will be placed in appropriate containers and transported off-site to an appropriate treatment or disposal facility. Based on available site data, it is estimated that approximately 1,000 gallons of product remain on the shallow bedrock aquifer at the FTA and that product recovery will require approximately 40 years.

The Product Recovery Alternative includes the following components:

- Product recovery;
- Product disposal; and
- Five-year site reviews.

3.2.3.3 Standards Assessment

The cleanup levels at the FTA were established to reduce hazard indices and carcinogenic risks to benchmark values as well as to protect groundwater. None of the conditions evaluated in the RAs for this site have changed.

There are no chemical- or location-specific ARARs associated with this alternative.

The action-specific ARARs and to be considered (TBC) criteria associated with this alternative are:

- RCRA Identification and Listing of Hazardous Waste, Toxicity Characteristic;
- RCRA Standards Applicable to Generators of Hazardous Waste;
- RCRA Container Storage Requirements;
- USEPA OSWER Directive 9345.3-03 FS;
- Maine Identification of Hazardous Wastes;
- Maine Standards for Generators of Hazardous Waste; and
- Maine Standards for Hazardous Waste Facilities.

3.2.4 SUMMARY OF RESPONSE ACTION(S) TAKEN

3.2.4.1 Description of Actions

Passive collection and recovery of product has begun. The Air Force acquired the services of an engineering services company (Montgomery Watson) to perform passive recovery of LNAPL at the FTA through a long term operations contract with the AFCEE.

3.2.4.2 Areas of Non-Compliance

There are no known areas of non-compliance with the ROD for the source area at this site.

3.2.4.3 Residual Risk

The no further source area (i.e., surface and subsurface soils) action decision for the FTA is based on an assumption of unlimited use and unrestricted exposure. However, based on the presence of product in the shallow bedrock, exposure to groundwater should remain restricted.

3.2.5 Results and Recommendations

3.2.5.1 Results

The FTA has been transferred to the USFWS. As part of the transfer agreement, USFWS will not use groundwater from this site without prior Air Force approval which is in accordance with the ROD for OU-12, Basewide Groundwater. Product recovery activities have begun at the site and are expected to continue for approximately 40 years.

3.2.5.2 Recommendations

- Air Force continue to conduct product recovery activities.
- Air Force to characterize product for presence of non-petroleum (i.e., chlorinated solvent) constituents.

3.2.5.3 Statement on Protectiveness

The remedy selected for the FTA site under OU-8 (source control) remains protective of human health and is expected to be protective of groundwater when product recovery is completed in accordance with the ROD signed for the site in 1999.

3.2.5.4 Five-Year Reviews

The next five-year review for the FTA site will be conducted in 2005.

3.2.6 REFERENCES

ABB Environmental Services, Inc. (ABB-ES), 1995. *Fire Training Area and Underground Transformer Site Operable Unit 8 Remedial Investigation Report,* February.

ABB-ES, 1997. *Corrective Action Plan for Underground and Aboveground Storage Tank Programs,* November.

Air Force Base Conversion Agency (AFBCA), 1996. *Record of Decision for the Disposal of Loring AFB, Maine,* April.

AFBCA, 1999. Letter from Peter W. Forbes (AFBCA) to Michael Nalipinski (US EPA) and Naji Akladiss (Maine DEP) *Fire Training Area Excavations, 1999,* 23 August 1999.

Bechtel Environmental, Inc. (BEI), 1996a. *Removal Actions for OUs 5, 8, 9, 10 and 11, Removal Actions Report,* February.

BEI, 1996b. *Bioventing at OUs 5, 8, 9, 10 and 11, Removal Action Report,* April.

BEI, 1997. *Removal Actions at OUs 3, 5, 8, 10, 11, and 13, Removal Action Report,* May.

BEI, 1998. *Bioventing at OUs 5, 8, 9, 10 and 11,* February.

BEI, 1999. *Biovent Sites Confirmation Sampling Field / Laboratory Results and Recommendations,* March.

Harding Lawson Associates (HLA), 1999a. *Proposed Plan for Sites Within Operable Units 5, 8, 9, 10 and 11,* May.

HLA, 1999b. *Sites Within Operable Units (OUs) 5, 8, 9, 10, and 11, Record of Decision,* September.

HAZWRAP, 2000. *Unrestricted Land-Use Determination for Operable Unit 9, Snow Barn Site,* January.

J.T. Langille, Inc. (JTL), 1998. *Corrective Action Report, Removal of Aboveground and Underground Aircraft Refueling Facilities, UST/AST and Free Product Removal Project,* March, revised July.

JTL, 1999. *Corrective Action Report Addendum 1, Removal of Aboveground and Underground Aircraft Refueling Facilities, UST/AST and Free Product Removal Project,* July.

Langille Aroostook Engineering Group , Inc. (LAEG), 2000. *Removal Action Report Addendum 2, Removal of Aboveground and Underground Aircraft Refueling Facilities, UST/AST and Free Product Removal Project, Removal of Fire Training Area Soils,* June.

URS, 1995a. *Engineering Evaluation/Cost Analysis for Operable Unit 8,* September.

URS, 1995b. *Action Memorandum for Operable Unit 8,* November.

URS, 1999. *Fire Training Area Pilot Study Report,* January.

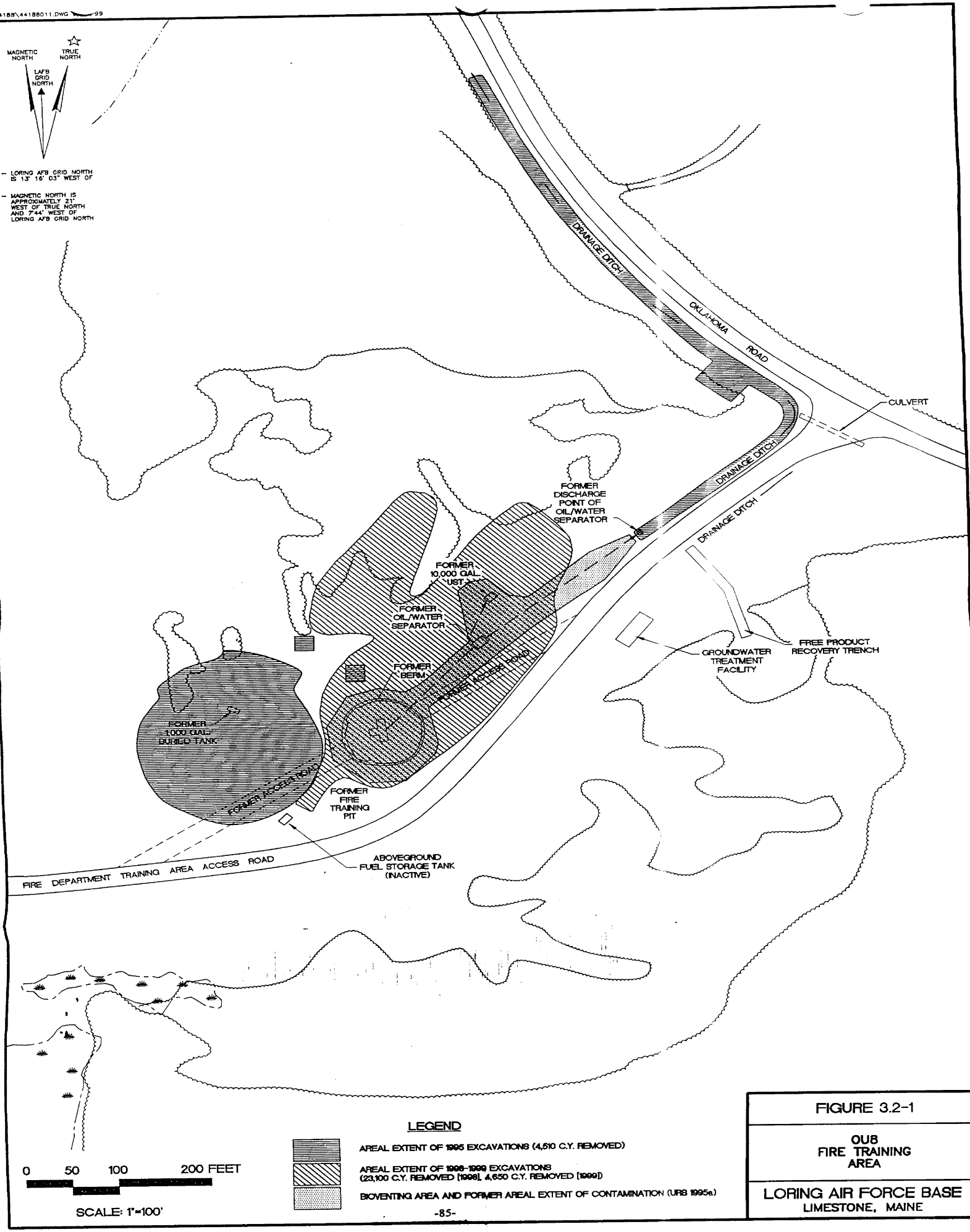

FIGURE 3.2-1

OU8
FIRE TRAINING AREA

LORING AIR FORCE BASE
LIMESTONE, MAINE

SECTION 3.3

OPERABLE UNIT 9
AUTO HOBBY SHOP

3.3.1 SCOPE AND NATURE OF FIVE-YEAR REVIEW

The USAF, in coordination with the USEPA, conducted this review of the Auto Hobby Shop (AHS) site pursuant to CERCLA § 121(c), NCP § 300.400(f)(4)(ii), and OSWER Directives 9355.7-02 (May 23. 1991) and 9355.7-02A (June 26, 1994). It is a policy review. The remedial action at the AHS site was installed in 1996, and the bioventing system is currently operating but the remedial objectives have not yet been met. The purpose of the review at the AHS site is to review the effectiveness of bioventing and assess performance of the system. This document has been prepared within the scope of a level Ia review.

3.3.2 SUMMARY OF SITE CONDITIONS

3.3.2.1 Site Location and Description

The South Flightline OU-9 is located in the south central portion of the Site and includes the AHS, Building 6570. The AHS site is located along the western side of Building 6570 northwest of the intersection of Weinman and Pennsylvania Roads (Figure 3.3-1). The eastern third of the AHS is paved and relatively flat. The central and western portion of the AHS is covered with grass and slopes downward toward the Flightline Drainage Ditch (FLDD) about 200 feet away. Detailed information about the AHS site is presented in the OU-9 Remedial Investigation Report (ABB-ES, 1995).

3.3.2.2 Site History

The AHS and immediate vicinity occupy approximately 2.2 acres. The AHS was used by base personnel for maintenance of personal vehicles. Activities included routine car maintenance, oil changes, parts cleaning, car painting, and car cleaning. Floor drains within the building were connected to the sanitary sewer system. Two USTs were located in the area of the AHS: a 5,000-gallon UST used to collect waste oil and a 5,000-gallon heating oil UST. Both tanks and contaminated soil associated with the heating oil tank were removed in 1992. Additionally, the heating oil tank was replaced with a new 2,000-gallon UST.

The likely sources of contamination at the AHS site include the waste oil and heating oil USTs and potential spills and releases resulting from past site activities. During RI activities conducted at the AHS between 1988 and 1994, 14 soil borings were completed to characterize the nature and distribution of soil contamination. Several monitoring wells and piezometers were also installed; however, groundwater associated with the site is being addressed in accordance with OU-12, and is discussed elsewhere in this review. The RI identified fuel-contaminated soils near the waste oil and heating oil USTs, and in the soil beneath the sewer lines (ABB-ES, 1995). Low concentrations of chlorinated solvents were

also detected in soils at the site. Contaminated soil at the AHS site is considered a low-level threat waste. There are no principal threat wastes present at the site.

The following is a summary of the COCs in soil (0 to 10 feet bgs) identified during the RI (ABB-ES, 1995).

Chemical of Concern	Frequency of Detection	Minimum Concentration	Maximum Concentration
Benzo(a)anthracene	4/13	0.11	7
Benzo(a)pyrene	3/13	0.038	7.4
Benzo(b)fluoranthene	5/13	0.071	15
Chrysene	5/13	0.041	5.5
Indeo(1,2,3-c,d)pyrene	2/13	2.2	6.5
TPH	10/14	37	39,000

Note: All concentrations in mg/kg.

Based on the current and anticipated future land use of the AHS site as a Job Corps Training Center for the Department of Labor (AFBCA, 1996), the commercial/industrial worker and construction worker may be exposed to contaminated soil by incidental ingestion, dermal absorption, and inhalation of VOCs and dust. The ecological RA conducted for the site concluded that there are no significant risks to ecological receptors from exposure to contaminated soil. Leaching of contaminants from subsurface soils to groundwater beneath the site may result in off-site migration of contaminants; however, groundwater associated with the site is being addressed in accordance with OU-12, and is not discussed in this review.

A Corrective Action Plan (CAP) was prepared for the AHS that proposed bioventing to treat the fuel-related soil contamination (ABB-ES, 1996). Site-specific, risk-based RGs, which also considered the potential impacts to groundwater due to leaching of contaminants, were developed for the AHS site and were included in the CAP (ABB-ES, 1996).

The bioventing system was installed in 1996. The final inspection of the bioventing system installation was performed in December 1996, and the system was certified operational and functional (Patrick St.Peter and Sons, Inc. [PSP], 1997). Soil samples were collected at the AHS in 1997. The sampling results indicated TPH-contaminated soil outside the northeast portion of the treatment zone of the bioventing system. An additional AIW was installed in January 1999 to address this area of contamination.

Although the soil contamination at the AHS site is fuel-related, the Regulators are concerned about the infrequent low level concentrations of chlorinated compounds detected in soils at the site during the RI. Therefore, the AHS will continue under the CERCLA process until the risk-based RGs are achieved that will allow the site to be available for unlimited use and unrestricted exposure.

3.3.3 SUMMARY OF RESPONSE ACTION SELECTED

The USAF and the USEPA, with concurrence of the MEDEP have determined that continued operation of the bioventing system is required at the AHS site to continue to address the petroleum and solvent contaminated subsurface soils. The bioventing system includes AIWs, a blower, an air dryer, a building to house the blower and ancillary equipment, piping, and soil gas monitoring points.

Based on information relating to types of contaminants, environmental media of concern, and potential exposure pathways, remedial objectives were developed. These remedial objectives were developed to mitigate existing and future potential threats to public health and the environment. The remedial action objectives (RAOs) are:

- Prevent human exposure (i.e., ingestion, inhalation, and dermal contact) to contaminated soil with concentrations in excess of remediation goals.
- Prevent ecological exposure (i.e., ingestion, inhalation, and biological uptake) to contaminated soil with concentrations in excess of remediation goals.
- Prevent soil contaminants with concentrations in excess of remediation goals from migrating to groundwater.

Worst-case RBSCs were developed for the *Unrestricted Land Use Determination for OU-9 Snow Barn Site* (HAZWRAP, 2000) that will allow the site to be available for unlimited use and unrestricted exposure. The RGs for the COCs at the AHS are the lowest of the RBSCs (HAZWRAP, 1999) or the CAP (ABB-ES, 1996a). The RGs are summarized as follows (HLA, 1999).

Chemical of Concern	Remediation Goal
Benzo(a)anthracene	2.5
Benzo(a)pyrene	0.25
Benzo(b)fluoranthene	2.5
Chrysene	8.5
Indeo(1,2,3-c,d)pyrene	2.5
TPH	870

Note: All concentrations in mg/kg.

In addition to the site-specific contaminants for which RGs have been established, confirmation samples at the AHS site will also be analyzed for VOCs, SVOCs, and PCBs. The samples will be analyzed for these other parameters to address the Regulators concern regarding the infrequent low level concentrations of chlorinated compounds detected in soils at the site during the RI. Due to the presence of low concentrations of chlorinated solvents detected in soils at the site during the RI, the AHS will continue under the CERCLA process until soil confirmation samples verify that these contaminants do not pose a site risk.

System operation, performance monitoring, and data reporting will continue to be conducted in accordance with the requirements of the ROD (HLA, 1999) and O&M Plan (BEI, 1996).

When soil confirmation sampling results indicate that the site-specific RGs have been achieved and that there are no other compounds present that pose an unacceptable risk to receptors, the bioventing system will be dismantled and the site will be restored to the original conditions.

3.3.4 SUMMARY OF RESPONSE ACTION(S) TAKEN

Based on the CAP prepared for the AHS site (ABB-ES, 1996), the bioventing system was installed at the AHS site in 1996. The original system included 19 AIWs and eight soil gas monitoring points. Following installation of the bioventing system, a 30-day testing period was initiated during which the system performance was monitored. As a result of this initial performance testing period, the final inspection of the bioventing system was performed and the system was certified operational and functional (PSP, 1997).

Operation and performance monitoring of the bioventing system at the AHS site was conducted between 1996 and 1999 and the results are presented in Semi-Annual Bioventing Performance Reports. Soil samples were collected in 1997 near the background soil gas monitoring point. The sampling results indicated the extent of petroleum contamination extended beyond the treatment zone of the original system. An AIW was installed in the untreated zone in 1999 to expand the area of treatment. The biovent system had operated a total of 945 days through August 31, 1999.

3.3.4.1 Performance Assessment

The *Semi-Annual Bioventing Performance Report for January-August 1999,* (BEI, 1999) presents the most recent system performance data. The majority of the AIWs are operating at or near their design flow rates. Respiration tests conducted in August 1999 indicate a high probability that respiration is occurring within the treatment area and that the mass of petroleum hydrocarbons is being reduced by bioremediation. Confirmation soil samples from within the treatment area of the AHS site have not been collected since the system started in 1996. Confirmation soil samples are planned for summer 2000. It is recommended that the system continue to run as designed and that annual confirmation soil samples be collected to monitor progress toward the RGs and effectiveness of system design.

O&M services are provided to the USAF by an engineering services company under contract to the AFCEE. BEI held the contract from 1996 until October 1999. MW currently holds the contract. The O&M services includes all maintenance requirements, monthly system measurements and an annual performance analysis.

3.3.4.2 Standards Assessment

Chemical-specific ARARs

3.3.4.2 Standards Assessment

Chemical-specific ARARs

Chemical-specific ARARs (i.e., USEPA RfDs and CSFs) were used during the development of the Site-specific, risk-based RGs and have not changed since publication of the RBSCs (HAZWRAP, 1999).

Location-specific ARARs

No location-specific ARARs were identified for the bioventing systems at these sites.

Action-specific ARARs

O&M of the bioventing system at the AHS site is being conducted in accordance with the action-specific ARARs regarding Federal and State air emissions standards. The bioventing system at the AHS is an air injection system with no direct discharge to the atmosphere. Contaminant concentrations in air that eventually reaches the atmosphere are expected to be well below limits set by the action-specific ARARs. Soil sampling was conducted at the AHS in 1997 in accordance with the action-specific ARARs regarding management of IDW. Future soil confirmation sampling will also be conducted in accordance with these requirements.

Therefore, bioventing at the AHS site complies with the ARARs presented in the ROD (HLA, 1999).

3.3.5 RESULTS AND RECOMMENDATIONS

3.3.5.1 Results

The remedy selected for the AHS site under OU-9 (source control) is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed.

The current data do not allow a determination that the bioventing system at the AHS site is functioning as designed. Data that are more complete are required before the determination can be made.

The necessary O&M of the biovent system at the AHS site is being performed.

3.3.5.2 Recommendations

System performance should be reviewed annually, including collection and analysis of soil samples to monitor progress toward RGs. A full round of soil confirmation samples should be taken when it appears that RGs have been achieved.

Five-year site reviews will be conducted for the AHS site under OU-9 (source control) until the levels of contaminants remaining at the site allow for unlimited use and unrestricted exposure.

3.3.5.3 Statement on Protectiveness

The remedy selected for the AHS site is expected to be protective of human health and the environment upon completion, and immediate threats to human health and the environment have been addressed.

3.3.5.4 Five-Year Reviews

The next five-year review for the AHS site will be conducted in 2005.

3.3.6 REFERENCES

ABB-ES, 1995. *South Flightline OU-9 Remedial Investigation Report.* January.

ABB-ES, 1996. *Operable Units 5 and 9 Corrective Action Plan.* April.

AFBCA, 1996. *Record of Decision for the Disposal of Loring AFB, Maine.* April.

BEI, 1996. *Bioventing at Operable Units 5, 8, 9, 10, and 11, Operations and Maintenance Plan.* January.

BEI, 1999. *Bioventing at Operable Units 5, 8, 9, 10, and 11, Semi-Annual Performance Report, January - August 1999.* December.

HAZWRAP, 2000. *Technical Memorandum, Unrestricted Land Use Determination for Operable Unit 9, Snow Barn Site, Loring, Maine.* January.

HLA, 1999. *Record of Decision for Sites Within Operable Units (OUs) 5, 8, 9, 10, and 11.* September.

Patrick St. Peter and Sons, 1997. *Install Bioremediation Systems in Fuel Tank Farm and Auto Hobby Shop, Removal Action Report.* October.

URS, 1995. *Operable Units 5, 9, 10, and 11, Design Analysis Report.* June.

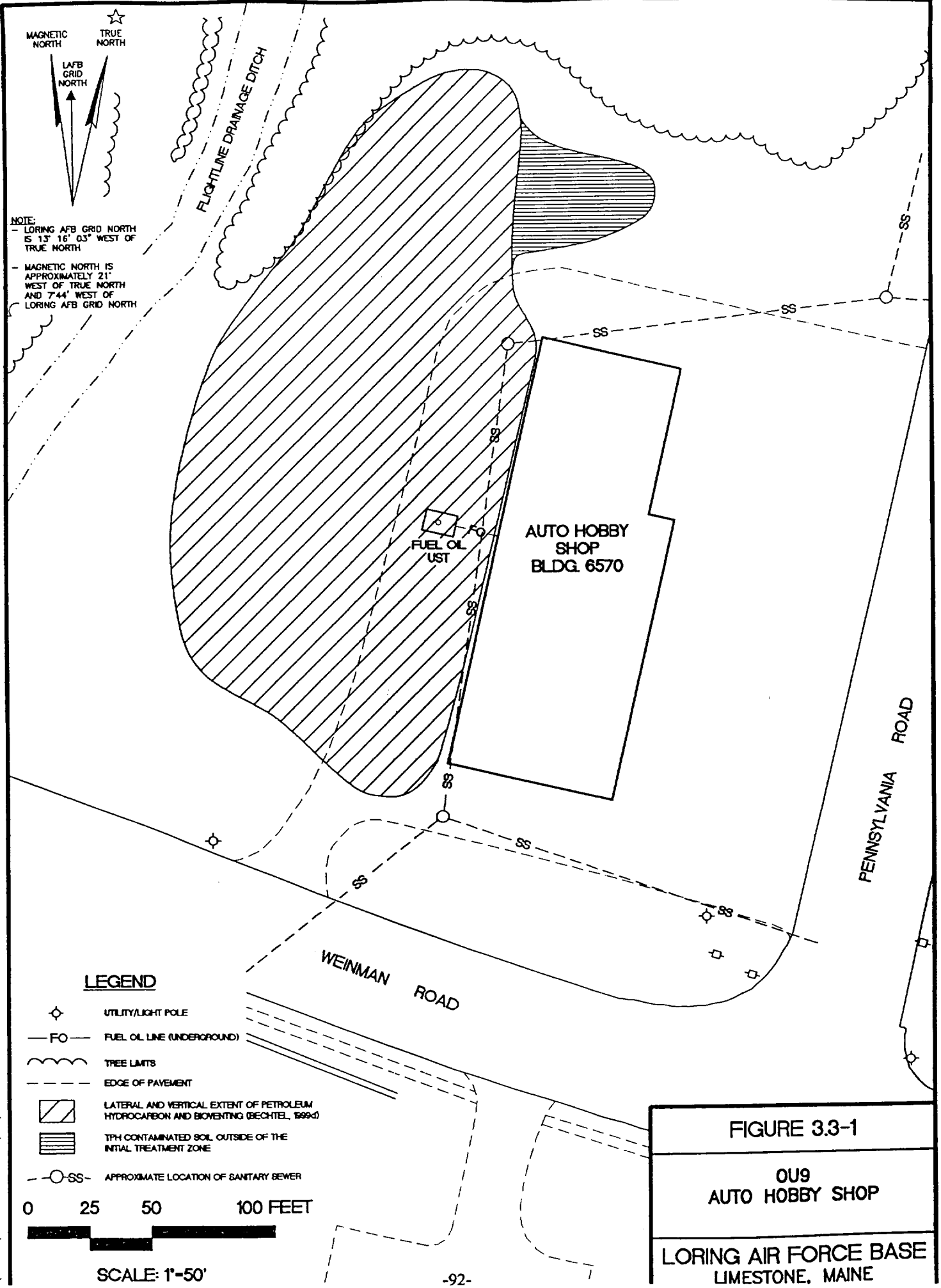

FIGURE 3.3-1

OU9
AUTO HOBBY SHOP

LORING AIR FORCE BASE
LIMESTONE, MAINE

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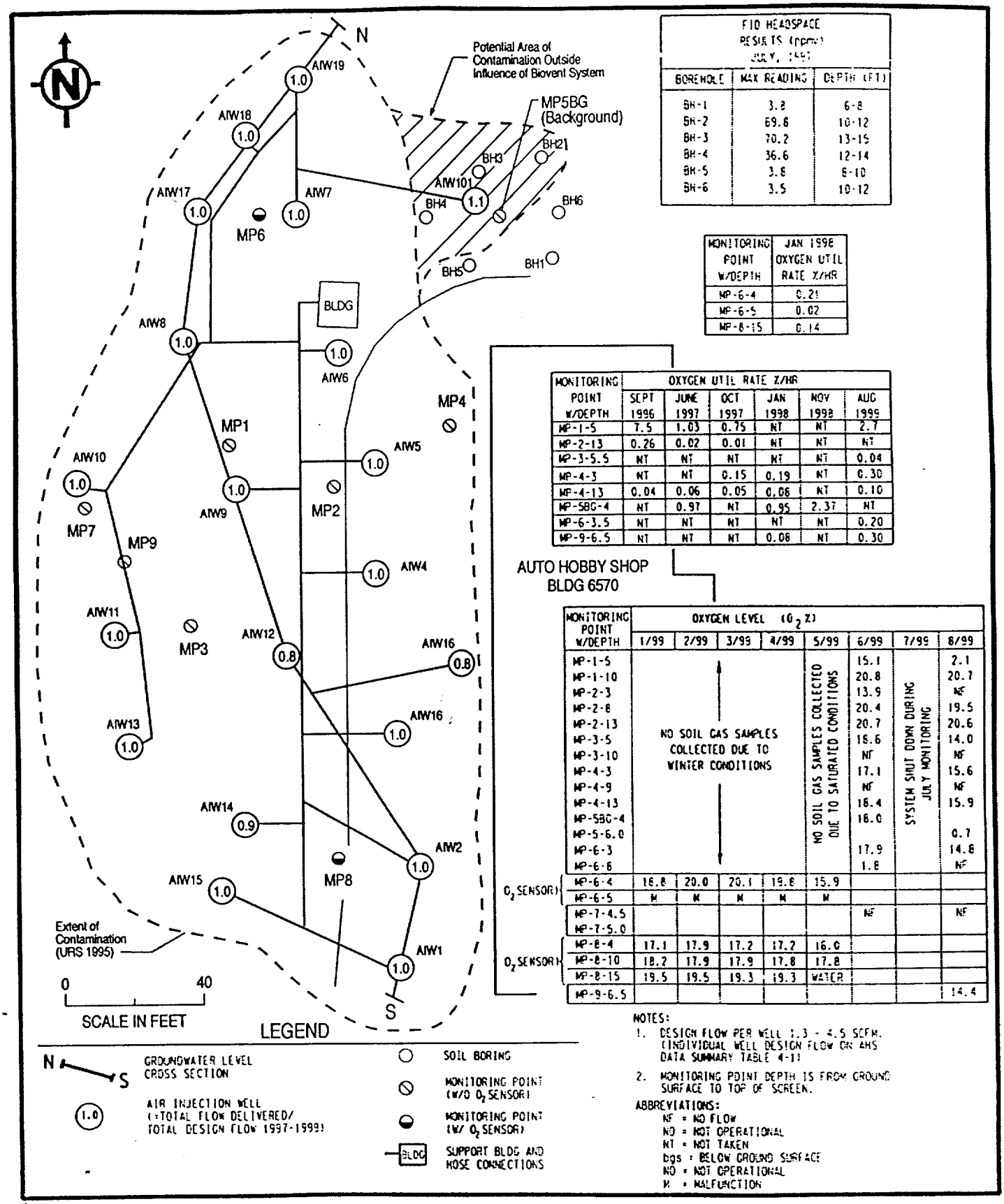

FID HEADSPACE RESULTS (ppmv) JULY, 1997

BOREHOLE	MAX READING	DEPTH (FT)
BH-1	3.8	6-8
BH-2	69.6	10-12
BH-3	70.2	13-15
BH-4	36.6	12-14
BH-5	3.8	8-10
BH-6	3.5	10-12

MONITORING POINT W/DEPTH	JAN 1998 OXYGEN UTIL RATE %/HR
MP-6-4	0.21
MP-6-5	0.02
MP-8-15	0.14

MONITORING POINT W/DEPTH	OXYGEN UTIL RATE %/HR SEPT 1996	JUNE 1997	OCT 1997	JAN 1998	NOV 1998	AUG 1999
MP-1-5	7.5	1.03	0.75	NT	NT	2.7
MP-2-13	0.26	0.02	0.01	NT	NT	NT
MP-3-5.5	NT	NT	NT	NT	NT	0.04
MP-4-3	NT	NT	0.15	0.19	NT	0.30
MP-4-13	0.04	0.06	0.05	0.08	NT	0.10
MP-SBG-4	NT	0.97	NT	0.95	2.37	NT
MP-6-3.5	NT	NT	NT	NT	NT	0.20
MP-9-6.5	NT	NT	NT	0.08	NT	0.30

AUTO HOBBY SHOP BLDG 6570

MONITORING POINT W/DEPTH	OXYGEN LEVEL (O_2 %) 1/99	2/99	3/99	4/99	5/99	6/99	7/99	8/99
MP-1-5	NO SOIL GAS SAMPLES COLLECTED DUE TO WINTER CONDITIONS				NO SOIL GAS SAMPLES COLLECTED DUE TO SATURATED CONDITIONS	15.1	SYSTEM SHUT DOWN DURING JULY MONITORING	2.1
MP-1-10						20.8		20.7
MP-2-3						13.9		NF
MP-2-8						20.4		19.5
MP-2-13						20.7		20.6
MP-3-5						16.6		14.0
MP-3-10						NT		NF
MP-4-3						17.1		15.6
MP-4-9						NF		NF
MP-4-13						18.4		15.9
MP-SBG-4						18.0		
MP-5-6.0								0.7
MP-6-3						17.9		14.8
MP-6-8						1.8		NF
MP-6-4 (O_2 SENSOR)	16.8	20.0	20.1	19.8	15.9			
MP-6-5 (O_2 SENSOR)	M	M	M	M	M			
MP-7-4.5						NF		NF
MP-7-5.0								
MP-8-4 (O_2 SENSOR)	17.1	17.9	17.2	17.2	16.0			
MP-8-10 (O_2 SENSOR)	18.2	17.9	17.9	17.8	17.8			
MP-8-15 (O_2 SENSOR)	19.5	19.5	19.3	19.3	WATER			
MP-9-6.5								14.4

NOTES:
1. DESIGN FLOW PER WELL 1.3 - 4.5 SCFM. (INDIVIDUAL WELL DESIGN FLOW ON AHS DATA SUMMARY TABLE 4-1)
2. MONITORING POINT DEPTH IS FROM GROUND SURFACE TO TOP OF SCREEN.

ABBREVIATIONS:
NF = NO FLOW
NO = NOT OPERATIONAL
NT = NOT TAKEN
bgs = BELOW GROUND SURFACE
NO = NOT OPERATIONAL
M = MALFUNCTION

Figure 3.3-2
AHS Biovent System Layout and Average Wellhead Flow
Loring Air Force Base